

allowed to move to the forward area position after the fan pitch has passed through the feather region.

While not specifically limited thereto, the preferred embodiment contemplates the execution of the concept disclosed herein by use of well known digital type of electronic controllers.

It should be understood that the invention is not limited to the particular embodiments shown and described herein, but that various changes and modifications may be made without departing from the spirit or scope of this novel concept as defined by the following claims.

We claim:

1. A control system for a turbine type of power plant powering a variable pitch propulsor of the type that is closely coupled to the power plant and is supported in a duct bypassing the power plant, said control system including coordinating means for controlling the pitch of the propulsor and the flow of fuel to the power plant, said coordinating means being responsive to a scheduled value of speed derived as a function of flight Mach. No., power plant inlet temperature, power lever position and actual power plant rotational speed for controlling fuel flow to the power plant and being responsive to said flight Mach. No. and said power lever position to synchronously control the pitch of the propulsor.

2. A control system as claimed in claim 1 wherein said coordinating means includes means for ascertaining a value indicative of the difference between actual power plant rotational speed and the power lever position biased by flight Mach No. and power plant inlet temperature.

3. A control system as claimed in claim 1 including means anticipating a change in said power lever position to further adjust fuel flow.

4. A control system as claimed in claim 3 wherein said anticipating means is responsive to flight Mach No.

5. A control system as claimed in claim 4 wherein said anticipation means produces an output signal which is a time integration of a derivative signal.

6. A control system as claimed in claim 5 wherein said derivative signal of anticipation means is the derivative of the output of the rate-limited first order lag of the power lever change input signal.

7. For a ducted fan propulsor having variable pitch blades and driven by a free turbine of a turbine type power plant, coordinated control means for controlling the pitch of said blades and the flow of fuel to said power plant, said coordinated control means for controlling fuel flow includes scheduling means responsive to power lever position, flight Mach No. and another engine parameter for producing a first signal, means responsive to free turbine speed for producing a second signal, means responsive to said first signal and said second signal for producing an output signal for controlling fuel flow and said coordinated control means for controlling pitch of the blades being responsive to power lever position and flight Mach No.

8. For a ducted fan propulsor as claimed in claim 7 wherein said other engine parameter is inlet temperature of said power plant.

9. For a ducted fan propulsor having variable pitch blades driven by a free turbine of a turbine type power plant and variable area duct exit nozzle coordinated control means for controlling the pitch of said blades and the flow of fuel to said power plant and the area of said nozzle, said coordinated control means for controlling fuel flow includes scheduling means responsive to power lever position, flight Mach No. and another engine parameter for producing a first signal, means responsive to free turbine speed for producing a second signal, means responsive to said first signal and said second signal for producing an output signal for controlling fuel flow, said coordinated control means for controlling pitch of the blades being responsive to power lever position and flight Mach No., and said coordinated control means being responsive to flight Mach No. and power lever position for producing a scheduled signal for controlling the area of said nozzle.

10. For a ducted fan propulsor as claimed in claim 9 including means for further controlling said nozzles to prevent surge by scheduling the surge limit as a function of flight Mach No. and corrected free turbine speed.

11. For a ducted fan propulsor as claimed in claim 10 including a selector for selecting the maximum of the value of said scheduled surge signal and the value of said scheduled nozzle area signal.

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